PATENT
Attorney Docket No. ASH01004

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Application of:	)	
	)	
Yang Wang	)	Group Art Unit: 2616
	)	
Application No.: 10/084,917	)	Examiner: S. Tsegaye
	)	
Filed: March 1, 2002	)	
	)	
For: RESOURCE ALLOCATION IN VIRTUAL ROUTER	)	
	)	
	)	

APPEAL BRIEF

U.S. Patent and Trademark Office
Customer Window, Mail Stop Appeal Brief – Patents
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

This Appeal Brief is submitted in response to the Final rejection mailed December 29, 2006 and in support of the Notice of Appeal filed February 28, 2007.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Verizon Communications Inc.

II. RELATED APPEALS AND INTERFERENCES

Appellant is unaware of any related appeals, interferences or judicial proceedings.

III. STATUS OF CLAIMS

Claims 1-6, 8-14, 16, 17, and 19-27 are pending in this application. Claims 7, 15, and 18 were previously cancelled. Claims 1-6, 8-14, 16, 17, and 19-27 are rejected. Claims 1-6, 8-14, 16, 17, and 19-27 are the subject of the present appeal.

IV. STATUS OF AMENDMENTS

No Amendment has been filed subsequent to the Final Office Action mailed December 29, 2006.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Each of the independent claims involved in this appeal is recited below, followed in parenthesis by examples of where support can be found in the specification and drawings for the claimed subject matter. In addition, each dependent claim argued separately below is also summarized in a similar manner.

Claim 1 recites: a routing system [Fig. 5, element 300] comprising a plurality of routing resources [Fig. 5, elements 510, 515, and 520; and paragraphs 0031-0035 and 0037-0040]; and a plurality of virtual routers [Fig. 3, system 300 and paragraph 0027] configured to share the routing resources in accordance with a programmably modifiable resource sharing configuration [paragraphs 0042 and 0056].

Claim 5 recites: the routing system of claim 1, wherein the routing resources include routing processes, forwarding processes, control resources, and data resources [paragraphs 0037-0041].

Claim 8 recites: a network point-of-presence (POP) comprising: a physical router system having a plurality of resources [Fig. 3, system 300 and paragraph 0027]; at least one backbone router implemented as a virtual router by the physical router system [Fig. 3, element 310 and paragraph 0027]; and at least one regional router implemented as a virtual router by the physical router system [Fig. 3, element 320 and paragraph 0027], wherein the backbone virtual router and the regional virtual router share resources of the physical router system and wherein the resources that are shared between the backbone virtual router and the regional virtual router are modifiable by a user [paragraph 0042 and 0056].

Claim 12 recites: the network POP of claim 11, wherein the logic resources include routing processes and forwarding processes [paragraph 0037 – 0039].

Claim 16 recites: a method comprising allocating a first set of resources as shared resources [Fig. 7, shared resources 702 and paragraph 0046]; allocating a second set of resources as non-shared resources [Fig. 7, non-shared resources 701 and paragraph 0046]; and implementing a plurality of virtual routers based on a sharing of resources from the first set of resources between the virtual routers and based on independently assigning resources of the second set of resources to each of the virtual routers [paragraphs 0046 and 0047], wherein the resources included in the first set of resources and the resources included in the second set of resources are user programmable [paragraph 0056].

Claim 20 recites: the method of claim 19, wherein the logic resources include routing processes and forwarding processes [paragraphs 0037 – 0041].

Claim 23 recites: a routing system [Fig. 5, element 300] comprising means for performing routing processes [Fig. 5 and element 604, paragraph 0044]; means for performing forwarding

processes [Figs. 5 and 6, element 603]; means for implementing control resources [Figs. 5 and 6, element 602, and paragraph 0044]; means for implementing data resources [Figs. 5 and 6, element 604]; and means for running a plurality of virtual routers [Fig. 5 and paragraphs 0031-0036] that share, based on a user programmable configuration [paragraph 0056], ones of the means for performing routing processes, the means for performing forwarding processes, the means for implementing control resources, and the means for implementing data resources [paragraphs 0037-0043].

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Whether claims 1-5, 16, 17, 19-21, 23, and 27 are unpatentable under 35 U.S.C. § 103(a) based on U.S. Patent No. 6,687,220 to Ayres ("Ayres") in view of U.S. Patent Application Publication 2002/0198974 to Shafer ("Shafer").

B. Whether claims 8-14 are unpatentable under 35 U.S.C. § 103(a) based on U.S. Patent Publication 2002/0099849 to Alfieri et al. ("Alfieri") in view of Shafer.

C. Whether claims 1 and 2 are unpatentable under 35 U.S.C. § 103(a) based on U.S. Patent Publication 2002/0062344 to Ylonen et al. ("Ylonen") in view of Shafer.

D. Whether claims 6, 22, and 24-26 are unpatentable under 35 U.S.C. § 103(a) over Ayres and Shafer and further in view of Alfieri.

VII. ARGUMENT

A. The rejection of claims 1-5, 16, 17, 19-21, 23 and 27 under 35 U.S.C. § 103 based on Ayres and Shafer should be reversed.

The initial burden of establishing a *prima facie* basis to deny patentability to a claimed invention always rests upon the Examiner. In re Oetiker, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In rejecting a claim under 35 U.S.C. § 103, the Examiner must provide a factual basis to support the conclusion of obviousness. In re Warner, 379 F.2d 1011, 154 USPQ 173 (CCPA 1967). Based upon the objective evidence of record, the Examiner is required to make the factual inquiries mandated by Graham v. John Deere Co., 86 S.Ct. 684, 383 U.S. 1, 148 USPQ 459 (1966).

1. Claims 1-4

With these principles in mind, claim 1 is directed to a routing system comprising a plurality of routing resources and a plurality of virtual routers configured to share the routing resources in accordance with a programmably modifiable resource sharing configuration. The combination of Ayres and Shafer do not disclose or suggest these features.

The Examiner contends that Ayres discloses a plurality of routing resources and a plurality of virtual routers, but concedes that Ayres does not disclose that the virtual routers are configured to share the routing resources in accordance with a programmably modifiable resource sharing configuration. (Final Office Action, page 2.) For this feature, the Examiner relies on Shafer. (Final Office Action, page 2.)

Ayres is directed to quality of service management in a router having multiple virtual router instances. (Ayres, Title.) To this end, Ayres appears to be primarily concerned with adjusting the rate at which packets are input to virtual routers. (Ayres, column 3, lines 25-31.) Ayres, however, is generally not concerned about the implementation of a particular virtual

router, and, as the Examiner concedes, does not disclose or suggest virtual routers that share routing resources in accordance with a programmably modifiable resource sharing configuration, as recited in claim 1. Appellant submits that Shafer does not cure this admitted deficiency of Ayres.

Shafer discloses a network router management interface. (Shafer, Title). The management interface of Shafer offers different presentation modes for viewing configuration and operation information encoded in extensible markup language obtained from a network router. (Shafer, Abstract). Shafer, however, does not disclose or suggest that the disclosed interface can be used to configure virtual routers to share routing resources in accordance with a programmably modifiable resource sharing configuration.

As described in paragraph 0004 of Shafer, router management interfaces may be used to configure a number of options relating to the operation of a router. However, none of the router management operations described in paragraph 0004 of Shafer, or described elsewhere in Shafer, relate to the configuration of virtual routers to share routing resources in accordance with a programmably modifiable resource sharing configuration, as recited in claim 1. In contrast, the management interface described by Shafer appears to be an interface for interacting with the conventional configuration options provided by a router.

To summarize the above discussion, Appellant submits that neither Ayres nor Shafer disclose or suggest virtual routers that share routing resources in accordance with a programmably modifiable resource sharing configuration, as recited in claim 1. Ayres generally discloses virtual routers, but not virtual routers that share routing resources as recited in claim 1. Shafer discloses a router management interface, but Shafer does not disclose using the router

management interface to configure virtual routers nor does Shafer disclose a programmably modifiable resource sharing configuration of router resources, as recited in claim 1.

Further, assuming, for the sake of argument, that one of ordinary skill in the art were to combine Ayres and Shafer, the likely result would not disclose or suggest each of the features of claim 1. Instead, the combination would likely include the management interface of Shafer used to configure the routers of Ayres using possible router configuration options described by Shafer and Ayres. As previously discussed, the possible router configuration options described by Shafer do not relate to the configuration of virtual routers to share routing resources in accordance with a programmably modifiable resource sharing configuration, as recited in claim 1.

For at least these reasons, Ayres and Shafer, either alone or in combination, do not disclose or suggest each of the features of claim 1.

In the Final Office Action, the Examiner addressed certain arguments similar to those given above. The Examiner states, for instance, that "Ayres clearly discloses that virtual routers share routing resources (such as: CPU, shared memory, single control function." (Final Office Action, page 11.) Appellants acknowledge that virtual routers, by definition, share resources. The resources shared by the virtual routers of Ayres, however, appear to be fixed. Claim 1, in contrast, recites sharing "routing resources in accordance with a programmably modifiable resource sharing configuration."

In the Final Office Action, the Examiner further states: "As known, in software-based machine, programs can be changed and upgraded and new feature [futures] are added easily than hardware changes." (Final Office Action, page 11.) Appellants do not see how this statement is

relevant to the rejection of claim 1. Although it may be known that software can be upgraded, this fact does not disclose or suggest a plurality of virtual routers configured to share the routing resources in accordance with a programmably modifiable resource sharing configuration, as recited in claim 1.

Still further, the Examiner notes that Shafer discloses making changes to a router's configuration. (Final Office Action, page 11.) As mentioned previously, Shafer discloses a management interface for interacting with conventional configurations options provided by a router. However, none of the router management operations described by Shafer relate to the configuration of virtual routers to share routing resources in accordance with a programmably modifiable resource sharing configuration, as recited in claim 1.

For at least the reasons discussed above, the Appellant respectfully submits that the rejection of claim 1 under 35 U.S.C. § 103 based on the combination of Ayres and Shafer is improper. Accordingly, reversal of the rejection of claims 1-4 is respectfully requested.

2. Claim 5

Claim 5 is dependent on claim 1 and is believed to be allowable for at least the reasons claim 1 is allowable. Additionally, claim 5 further recites features that are not disclosed or suggested by Ayres and Shafer, either alone or in combination.

Claim 5 recites that the routing resources of claim 1 include routing processes, forwarding processes, control resources, and data resources. The Examiner relies on Ayres to allegedly disclose these features of claim 5. (Final Office Action, page 3.) Definitions of these resources are given in the pending specification at, for example, paragraphs [0037] through

[0041]. Although Ayres generally discusses virtual routers, Ayres does not appear to be particularly concerned with how resources are allocated to the virtual routers, much less that the shared routing resources include the particular resources recited in claim 5.

In rejecting claim 5, the Examiner points to various physical components in the system described by Ayres. (Final Office Action, page 3.) In particular, the Examiner points to the claimed routing processes as being disclosed by element 40 of Ayres and the forwarding processes being disclosed by the CPU of Ayres. Element 40 of Ayres refers to a communication interface. (Ayres, column 4, lines 62 and 63). A CPU and a communication interface do not disclose or suggest the routing processes and forwarding processes recited in claim 5. As consistently used and defined by the specification, the routing processes and forwarding processes refer to logical resources of the router. (See Appellant's specification, paragraph [0037]).

For at least the reasons discussed above, Appellant respectfully submits that the rejection of claim 5 under 35 U.S.C. § 103 based on the combination of Ayres and Shafer is improper. Accordingly, reversal of the rejection of claim 5 is respectfully requested.

3. Claims 16, 17, 19, and 21

Claim 16 is directed to method comprising allocating a first set of resources as shared resources; allocating a second set of resources as non-shared resources; and implementing a plurality of virtual routers based on a sharing of resources from the first set of resources between the virtual routers and based on independently assigning resources of the second set of resources to each of the virtual routers, wherein the resources included in the first set of resources and the

resources included in the second set of resources are user programmable.

Ayres does not disclose or suggest many of the features recited in claim 16. Ayres does not disclose or suggest, for example, allocating a first set of resources as shared resources and allocating a second set of resources as non-shared resources. Simply because Ayres discloses resources that are used to implement virtual routers in no way discloses or suggests allocating the first and second set of resources, as recited in claim 16.

Additionally, Ayres does not disclose or suggest implementing a plurality of virtual routers based on a sharing of resources from the first set of resources between the virtual routers and based on independently assigning resources of the second set of resources to each of the virtual routers, as recited in claim 16. As previously mentioned, Ayres generally discloses virtual router instances within a single router. Ayres, however, does not disclose or suggest, as recited in claim 16, implementing a plurality of virtual routers based on a sharing of resources from the first set of resources between the virtual routers and based on independently assigning resources of the second set of resources to each of the virtual routers. In rejecting claim 16, the Examiner contends that the disclosure of Ayres relating to adjusting packet flow rates of ingress queues associated with one or more virtual routers discloses this feature of claim 16. (Final Office Action, page 4; see also, Ayres, column 3, lines 25-32.) Appellants respectfully disagree with the Examiner's interpretation of Ayres.

Ingress data queues 48 of Ayres are described by Ayres as queues that hold data for processing by the virtual routers (VRIs 50 and 52) of Ayres. (Ayres, column 5, lines 23-29.) Adjusting the rates of these input queues, as described by Ayres, does not disclose or suggest implementing a plurality of virtual routers based on a sharing of resources from the first set of

resources between the virtual routers and based on independently assigning resources of the second set of resources to each of the virtual routers, as recited in claim 16. Appellant submits that adjusting an input rate for a virtual router is not equivalent to implementing a plurality of virtual routers based on sharing of resources, as recited in claim 16. Ayres simply does not implement virtual routers in the manner recited in claim 16.

Claim 16 further recites that the resources included in the first set of resources and the resources included in the second set of resources are user programmable. The Examiner concedes that Ayres does not disclose or suggest this aspect of claim 16 and relies on Shafer. (Final Office Action, page 4.) As discussed previously with respect to Shafer, Shafer describes a router management interface that may be used to configure options relating to the operation of a router. However, none of the router management operations described by Shafer relate to the sharing of resources to implement virtual routers. Shafer, therefore, cannot possibly suggest resources (which are shared and used to implement virtual routers) that are user programmable, as recited in claim 16. In contrast, the management interface described by Shafer appears to be an interface for interacting with the conventional configuration options provided by a router.

For at least these reasons, Ayres and Shafer, either alone or in combination, do not disclose or suggest each of the features of claim 16. For at least the reasons discussed above, Appellant respectfully submits that the rejection of claim 16 under 35 U.S.C. § 103 based on the combination of Ayres and Shafer is improper. Accordingly, the reversal of the rejection of claims 16, 17, 19, and 21 is respectfully requested.

4. Claim 20

Claim 20 is dependent on claim 19 and is believed to be allowable for at least the reasons claim 1 is allowable. Additionally, claim 20 further recites features that are not disclosed or suggested by Ayres and Shafer, either alone or in combination.

Claim 20 recites that the logic resources include routing processes and forwarding processes. The Examiner relies on Ayres to allegedly disclose these features of claim 20. (Final Office Action, page 5.) Specifically, the Examiner appears to rely on communication interface 40 and DSPs 42 of Ayres to disclose the recited routing processes and CPU 44 of Ayres as disclosing the recited forwarding processes. Appellant does not agree with the Examiner's interpretation of Ayres.

Communication interface 40 and DSPs 42 of Ayres, for instance, cannot be fairly interpreted as a "routing process." A definition of a routing process is given at paragraph 0038 of the instant specification. Communication interface 40 and DSPs 42 of Ayres appear to be hardware elements. These features of Ayres simply do not disclose or suggest that the logic resources of claim 20 include routing processes.

For at least the reasons discussed above, Appellant respectfully submits that the rejection of claim 20 under 35 U.S.C. § 103 based on the combination of Ayres and Shafer is improper. Accordingly, reversal of the rejection of claim 20 is respectfully requested.

5. Claims 23 and 27

Claim 23 is directed to a routing system comprising means for performing routing processes; means for performing forwarding processes; means for implementing control

resources; means for implementing data resources; and means for running a plurality of virtual routers that share, based on a user programmable configuration, ones of the means for performing routing processes, the means for performing forwarding processes, the means for implementing control resources, and the means for implementing data resources.

Ayres and Shafer, either alone or in combination, do not disclose or suggest each feature recited in claim 23. Neither Ayres nor Shafer, for example, disclose or suggest means for running a plurality of virtual routers that share, based on a user programmable configuration, ones of the means for performing routing processes, the means for performing forwarding processes, the means for implementing control resources, and the means for implementing data resources.

In rejecting claim 23, the Examiner concedes that "Ayres does not expressly disclose that resources are user programmable." (Final Office Action, page 6.) For this, the Examiner relies upon Shafer. Appellant disagrees with the Examiner's interpretation of Shafer. Shafer describes a router management interface that may be used to configure options relating to the operation of a router. However, none of the router management operations described by Shafer relate to the sharing of resources to implement virtual routers. Shafer, therefore, cannot possibly suggest routers that share resources "based on a user programmable configuration," as recited in claim 23. In contrast, the management interface described by Shafer appears to be an interface for interacting with the conventional configurations options provided by a router.

Further, assuming, for the sake of argument, that one of ordinary skill in the art were to combine Ayres and Shafer, the likely result would not disclose or suggest each of the features of claim 23. Instead, the combination would likely include the management interface of Shafer

used to configure the routers of Ayres using possible router configuration options described by Shafer and Ayres. The combination would not, however, include, as recited in claim 23, means for running a plurality of virtual routers that share, based on a user programmable configuration, ones of the means for performing routing processes, the means for performing forwarding processes, the means for implementing control resources, and the means for implementing data resources.

For at least these reasons, Ayres and Shafer, either alone or in combination, do not disclose or suggest each of the features of claim 23. For at least the reasons discussed above, Appellant respectfully submits that the rejection of claim 23 under 35 U.S.C. § 103 based on the combination of Ayres and Shafer is improper. Accordingly, the reversal of the rejection of claims 23 and 27 is respectfully requested.

B. The rejection of claims 8-14 under 35 U.S.C. § 103 based on Alfieri and Shafer should be reversed.

1. Claims 8-11, 13, and 14

Claim 8 is directed to a network point-of-presence (POP) comprising a physical router system having a plurality of resources; at least one backbone router implemented as a virtual router by the physical router system; and at least one regional router implemented as a virtual router by the physical router system. As is further recited in claim 8, the backbone virtual router and the regional virtual router share resources of the physical router system and the resources that are shared between the backbone virtual router and the regional virtual router are modifiable by a

user.

In rejecting claim 8, the Examiner contends that Alfieri discloses many of the features recited in claim 8 but concedes that Alfieri "does not expressly disclose resources that modifiable by a user." (Final Office Action, page 7). The Examiner contends that Shafer discloses this feature of claim 8. (Final Office Action, page 7).

Alfieri discloses a dense virtual packet switching system including a memory divided into context areas for a set of virtual private routed networks (VPRNs). (Alfieri, Abstract). Alfieri is similar to Ayres in that both disclose virtual routers. In Alfieri, as with Ayres, the resources that Alfieri uses to implement the virtual routers appears to be predetermined (i.e., fixed). Alfieri does not disclose or suggest that the resources that are shared between routers are modifiable by a user, as is recited in claim 8.

Appellant submits that Shafer does not cure the deficiencies of Alfieri. As previously mentioned, Shafer discloses a network router management interface that offers different presentation modes for viewing configuration and operation information. Shafer, however, does not disclose or suggest that the disclosed interface can be used to modify resources that are shared between virtual routers, much less to modify resources that are shared between a backbone virtual router and a regional virtual router, as recited in claim 8.

As previously discussed, the router management interfaces of Shafer may be used to configure a number of options relating to the operation of a router. However, none of the router management operations described in Shafer relate to modifying resources that are shared between virtual routers, as recited in claim 8. In contrast, the management interface described by Shafer appears to be an improved interface for interacting with the conventional configurations options

provided by a router.

For at least these reasons, Appellant respectfully submits that the rejection of claim 8 under 35 U.S.C. § 103 based on the combination of Alfieri and Shafer is improper. Accordingly, reversal of the rejection of claims 8-11, 13, and 14 is respectfully requested.

2. Claim 12

Claim 12 is indirectly dependent on claim 8 and is believed to be allowable for at least the reasons claim 8 is allowable. Additionally, claim 12 further recites features that are not disclosed or suggested by Alfieri and Shafer, either alone or in combination.

Claim 12 recites that the logic resources include routing processes and forwarding processes. The Examiner relies on Alfieri to allegedly disclose these features of claim 12, (Final Office Action, page 8), and specifically cites paragraphs 0037 and 0032 of Alfieri.

Although paragraphs 0037 and 0032 of Alfieri discuss "routing protocols" and "forwarding engines," respectively, these sections of Alfieri in no way disclose or suggest that these elements of Alfieri are resources that are shared in the manner recited in claim 12 (and claim 8, from which claim 12 indirectly depends).

For at least the reasons discussed above, Appellant respectfully submits that the rejection of claim 12 under 35 U.S.C. § 103 based on the combination of Ayres and Shafer is improper. Accordingly, reversal of the rejection of claim 12 is respectfully requested.

C. The rejection of claims 1 and 2 under 35 U.S.C. § 103 based on Ylonen and Shafer should be reversed.

In rejecting claims 1 and 2 based on Ylonen, the Examiner points to Fig. 1b and paragraph [0004] of Ylonen as disclosing multiple virtual routers 110-112 implemented by a processor 116. (Final Office Action, page 9). The Examiner concedes, however, that "Ylonen fails to disclose resources that are programmably modifiable." (Final Office Action, page 9).

Ylonen generally discusses the concept of virtual routers. Paragraph [0004] of Ylonen states:

> Recently, the concept of virtual routers has been introduced, as in FIG. 1b. A virtual router 110, 111 or 112 is a logical concept instead of a physical one. A single physical computing device 113 in a network may house a number of virtual routers that use the same hardware, i.e. the same physical input lines 114 and output lines 115 (which may again physically be the same as the input lines) and the same processor 116. Conceptually the virtual routers are separate entities, and a suitable multiple access scheme is applied to share the common physical resources between them. It is even possible to construct a virtual network where the connections between hosts go through virtual routers. Multiple virtual networks may rely on the same cabling and the same physical routers without having any knowledge of each other. This is a popular way of implementing virtual private networks or VPNs, each of which can serve for example as the backbone network connecting the branch offices of a large company together.

Neither this section of Ylonen, nor any other section of Ylonen, however, discloses or suggests, as is recited in claim 1, a routing system comprising a plurality of routing resources and a plurality of virtual routers configured to share the routing resources in accordance with a programmably modifiable resource sharing configuration. Appellant submits that Shafer does not cure this admitted deficiency of Ylonen.

Shafer discloses a network router management interface. (Shafer, Title). The management interface of Shafer offers different presentation modes for viewing configuration and operation information encoded in extensible markup language obtained from a network

router. (Shafer, Abstract). Shafer, however, does not disclose or suggest that the disclosed interface can be used to configure virtual routers to share routing resources in accordance with a programmably modifiable resource sharing configuration.

As described in paragraph 0004 of Shafer, router management interfaces may be used to configure a number of options relating to the operation of a router. However, none of the router management operations described in paragraph 0004 of Shafer, or described elsewhere in Shafer, relate to the configuration of virtual routers to share routing resources in accordance with a programmably modifiable resource sharing configuration, as recited in claim 1. In contrast, the management interface described by Shafer appears to be an interface for interacting with the conventional configurations provided options provided by a router.

Accordingly, Appellant submits that neither Ylonen nor Shafer disclose or suggest virtual routers that share routing resources in accordance with a programmably modifiable resource sharing configuration, as recited in claim 1. Ylonen discloses virtual routers, but not virtual routers that share routing resources as recited in claim 1. Shafer discloses a router management interface, but Shafer does not disclose using the router management interface to configure virtual routers to share routing resources in the manner recited in claim 1.

Further, assuming, for the sake of argument, that one of ordinary skill in the art were to combine Ylonen and Shafer, the likely result would not disclose or suggest each of the features of claim 1. Instead, the combination would likely include the management interface of Shafer used to configure the routers of Ylonen using possible router configuration options described by Shafer and Ylonen. The possible router configuration options described by Shafer and Ylonen, however, do not disclose or suggest configuring virtual routers to share routing resources in

accordance with a programmably modifiable resource sharing configuration, as recited by claim 1.

For at least these reasons, Appellant submits that Ylonen and Shafer, either alone or in combination, do not disclose or suggest each of the features of claim 1. Therefore, the rejection of claim 1 under 35 U.S.C. § 103 based on the combination of Ylonen and Shafer is improper. Accordingly, reversal of the rejection of claims 1 and 2 is respectfully requested.

D. The rejection of claims 6, 22 and 24-26 under 35 U.S.C. § 103 based on Ayres, Shafer, Alfieri should be reversed.

Claim 6 depends indirectly from claim 1, claim 22 depends indirectly from claim 21, and claims 24-26 depend from claim 23. Appellant submits that Alfieri does not remedy the deficiencies in the combination of Ayres and Shafer, as discussed above with respect to claims 1, 21, or 23. Therefore, as a factual matter, the combination of Ayres, Shafer, and Alfieri does not disclose or suggest each of the features recited in these claims and the rejection of these claims should be reversed.

VIII. CONCLUSION

In view of the foregoing arguments, the Appellant respectfully solicits the Honorable Board to reverse the Examiner's rejections of claims 1-6, 8-15, 16, 17, and 19-27. In addition, as the Appellant's remarks with respect to the Examiner's rejections are sufficient to overcome the rejections, the Appellant's silence as to assertions by the Examiner in the Final Office Action or certain requirements that may be applicable to such rejections (e.g., whether a reference constitutes prior art) is not a concession by the Appellant that such assertions are accurate or such requirements have been met, and the Appellant reserves the right to analyze and dispute such in the future.

To the extent necessary, a petition for an extension of time under 37 C.F.R. § 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 50-1070 and please credit any excess fees to such deposit account.

Respectfully submitted,

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IX. APPENDIX

1. A routing system comprising:

a plurality of routing resources; and

a plurality of virtual routers configured to share the routing resources in accordance with a programmably modifiable resource sharing configuration.

2. The routing system of claim 1, wherein the routing resources includes logic resources and physical resources.

3. The routing system of claim 1, wherein the logic resources include routing processes and forwarding processes.

4. The routing system of claim 3, wherein the physical resources include control resources and data resources.

5. The routing system of claim 1, wherein the routing resources include routing processes, forwarding processes, control resources, and data resources.

6. The routing system of claim 4, wherein the control resources include at least one routing table and the data resources include transmission bandwidth of at least one port of the routing system.

8. A network point-of-presence (POP) comprising:

a physical router system having a plurality of resources;

at least one backbone router implemented as a virtual router by the physical router system; and

at least one regional router implemented as a virtual router by the physical router system, wherein

the backbone virtual router and the regional virtual router share resources of the physical router system and wherein the resources that are shared between the backbone virtual router and the regional virtual router are modifiable by a user.

9. The network POP of claim 8, further comprising:

ports connecting the backbone virtual router to a high capacity transit network; and

ports connecting the regional router to a metropolitan area network.

10. The network POP of claim 8, wherein the physical router is a single physical router.

11. The network POP of claim 8, wherein the plurality of resources include logic resources and physical resources.

12. The network POP of claim 11, wherein the logic resources include routing processes and forwarding processes.

13. The network POP of claim 11, wherein the physical resources include control resources and data resources.

14. The network POP of claim 13, wherein the control resources include at least one routing table and the data resources include transmission bandwidth of at least one port of the routing system.

16. A method comprising:

allocating a first set of resources as shared resources;

allocating a second set of resources as non-shared resources; and

implementing a plurality of virtual routers based on a sharing of resources from the first set of resources between the virtual routers and based on independently assigning resources of the second set of resources to each of the virtual routers, wherein the resources included in the first set of resources and the resources included in the second set of resources are user programmable.

17. The method of claim 16, wherein the first and second set of resources are implemented by a single physical router system.

19. The method of claim 16, wherein the resources of the first and second set of

resources include logic resources and physical resources.

20. The method of claim 19, wherein the logic resources include routing processes and forwarding processes.

21. The method of claim 19, wherein the physical resources include control resources and data resources.

22. The method of claim 21, wherein the control resources include at least one routing table and the data resources include transmission bandwidth of at least one port of a routing system.

23. A routing system comprising:

means for performing routing processes;

means for performing forwarding processes;

means for implementing control resources;

means for implementing data resources; and

means for running a plurality of virtual routers that share, based on a user programmable configuration, ones of the means for performing routing processes, the means for performing forwarding processes, the means for implementing control resources, and the means for implementing data resources.

24. The routing system of claim 23, wherein the means for performing routing processes includes means for building routing tables and forwarding tables based on network topology.

25. The routing system of claim 24, wherein the means for performing forwarding processes includes means for comparing information in packet headers to the forwarding tables.

26. The routing system of claim 24, wherein the means for implementing control resources includes means for storing the routing and forwarding processes.

27. The routing system of claim 23, wherein the means for implementing data resources includes means for implementing a port bandwidth of the routing system.

X. EVIDENCE APPENDIX

None

XI. RELATED PROCEEDINGS APPENDIX

None